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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,814	11/29/2001	Shuji Doi	Q67430	9735

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SUGHRUE MION, PLLC  
2100 Pennsylvania Avenue, NW  
Washington, DC 20037-3213

EXAMINER
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YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

MAIL DATE	DELIVERY MODE
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09/13/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/995,814	DOI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Marie R. Yamnitzky	1774	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 6-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. This Office action is in response to applicant's amendment filed July 02, 2007, which amends claim 1 and cancels claim 3.

Claims 1 and 6-27 are pending.

2. Claims 18-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitations of claims 18-27 are not clear because claim 18 depends from claim 3, which has been cancelled.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 6-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. (US 6,361,887 B1).

Claims 18-27 are included in this rejection as if claim 18 depended from claim 1.

Shi et al. disclose fluorescent polymers comprising one or more repeating units similar to units of formula (1) and one or more repeating units of formula (8) as defined in present claim 1, wherein Ar<sub>1</sub> is similar to the group represented by formula (1') as defined in claim 1. Shi et al.

Art Unit: 1774

disclose electroluminescent (EL) devices wherein the fluorescent polymer is disposed between an anode and a cathode. For example, see the abstract, column 37, line 57-c. 38, l. 55 and the claims.

Each of polymers 68-71 having the formula shown in columns 15-16 of Shi's patent comprises a repeating unit of formula (8) wherein  $Ar_2$  is represented by formula (2') as defined in present claim 1. (Note that the definitions of  $R_1$  to  $R_4$  as set forth in the first four lines of column 16 should apparently be set forth after the second formula spanning columns 15 and 16; compare to the second formula spanning columns 65 and 66 and accompanying definitions of  $R_1$  to  $R_4$ .) Polymers 68-71 comprise a repeating unit similar to units of present formula (1) wherein  $Ar_1$  is a group represented by present formula (1'). In polymers 68 and 69, the naphthylene groups (the groups of present formula (1')) are unsubstituted, whereas in polymer 70 the naphthylene groups are substituted by an alkyl group and in polymer 71 the naphthylene groups are substituted by an alkoxy group.

Shi's specific polymers differ from the polymers as defined in the present claims in that none of the specific polymers disclosed in the patent are polymers having units of formula (1) in which a naphthylene group ( $Ar_1$  of formula (1')) contains an alkoxyphenyl group as a substituent. However, "substituted aryl" is among the possibilities for the substituents on the naphthylene groups of Shi's polymers and "4-methoxyphenyl" [sic] is among the preferences taught by Shi et al. See column 3, lines 22-40. (Shi's polymer 70 comprises an alkoxyphenyl group, 4-methoxyphenyl, as a substituent on the fluorenylene group instead of the naphthylene group.)

It would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to make polymers within Shi's guidelines other than the specific polymers disclosed by Shi in order to provide a variety of polymers suitable for use as a luminescent material in an EL device as taught by Shi. One of ordinary skill in the art would have reasonably expected substituted polymers containing substituents specifically taught by Shi et al., especially those containing the preferred substituents taught by Shi et al., to be suitable for use as a luminescent material in an EL device.

Shi et al. also do not explicitly disclose the polystyrene reduced number-average molecular weight of the polymers as required by the present claims. Shi et al. disclose weight average molecular weights. For example see c. 37, l. 27-31 and Table 1 in c. 54. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number average molecular weights for Shi's fluorescent polymers based on properties affected by molecular weight.

Regarding present claims 6 and 7, the prior art discloses polymers similar to the polymers as defined in present claim 1, wherein the polymers have amounts of repeating units within the ranges set forth in claims 6 and 7. In the aforementioned polymers 68-71, the total number of repeating units represented by formulae (1) and (8) is 75 mol% of all repeating units, and the amount of repeating units represented by formula (1) is about 67 mol% based on the total amount of repeating units represented by formulae (1) and (8).

Devices having the layer structure specified in claim 8, with claims 11-13 dependent therefrom, and in claim 18, with claims 21-23 dependent therefrom, are disclosed by Shi et al. (e.g. see c. 37, l. 57- c. 38, l. 55).

Further with respect to present claims 9, 10, 19 and 20, it would have been within the level of ordinary skill in the art at the time of the invention to include auxiliary layers based on the properties afforded by those layers. The layers required by claims 9, 10, 19 and 20 are suggested by Shi et al. (e.g. see c. 38, l. 32-43).

Further with respect to present claims 14-17 and 24-27, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to utilize Shi's polymeric electroluminescent devices in articles which conventionally make use of electroluminescent devices.

5. Claims 1 and 6-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi et al. (EP 1 043 382 A2).

Claims 18-27 are included in this rejection as if claim 18 depended from claim 1.

See the whole document, especially the claims and paragraphs [0014]-[0028], [0034] and [0042].

Noguchi et al. suggest polymeric fluorescent substances within the scope of the present claims.

The fifth formula following "[Chemical formulae 10]" suggests a divalent group represented by formula (1') as defined in present claim 1.

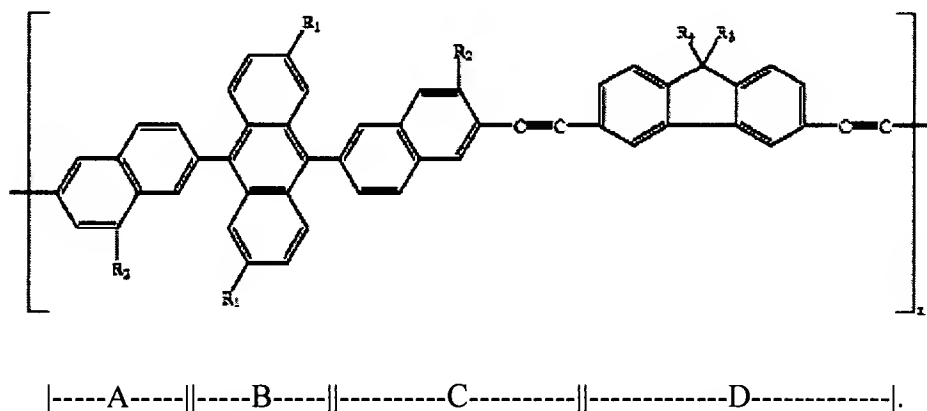
The seventh formula following “[Chemical formulae 13]” suggests a divalent group represented by formula (2’) as defined in present claim 1.

Noguchi et al. suggest the use of these polymeric fluorescent substances in polymer light emitting devices having the layer structures required by present claims 8-13 and 18-23. Noguchi et al. further suggest the use of polymer light emitting devices comprising these polymeric fluorescent substances in articles as claimed in present claims 14-17 and 24-27.

Regarding the requirement that the naphthylene group represented by present formula (1’) be substituted by at least one alkoxyphenyl group, such repeating units are suggested by the prior art. The naphthylene groups represented by the fifth formula following “[Chemical formulae 10]” may be substituted by at least one alkoxyphenyl group such as when at least one of the R variables is an alkoxyphenyl group. As defined in paragraph [0020], R may represent an aryl group of 6 to 20 carbon atoms and as taught in paragraph [0042], an alkoxyphenyl group is an example of an aryl group of 6 to 20 carbon atoms.

Noguchi et al. do not disclose a specific example of a polymeric fluorescent substance meeting the limitations of the present claims, but suggest numerous polymers within the scope of the present claims. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various polymeric fluorescent substances suggested by Noguchi et al. with the expectation that polymers comprising the divalent groups and substituted by the substituents specifically taught by Noguchi et al. would be fluorescent and would be suitable for the purposes suggested in the prior art.

With respect to the rejection based on the patent to Shi et al., applicant argues that the monomeric unit (1) required by the present claims is distinct from the 9,10-di(2-naphthyl)anthracene of the prior art. The examiner respectfully disagrees. The present claim language does not exclude anthracene groups and/or the 9,10-di-(2-naphthyl)anthracene groups of Shi's polymers, and does not limit the pattern of distribution of repeating units of formula (1), formula (8), and any other repeating units which may be present in the polymer. Based on applicant's arguments, it appears that applicant considers the 9,10-di(2-naphthyl)anthracene portion of Shi's polymers only as a single repeating unit. However, this portion can also be considered as a composite of multiple repeating units. For example, Shi's polymers 68-71 can be considered to be a polymer of four repeating units A, B, C and D as designated below:



The naphthylene unit A and the naphthylenevinylene unit C are each a repeating unit of present formula (1) wherein Ar<sub>1</sub> is a divalent group of formula (1') (with the exception that in Shi's



Art Unit: 1774

polymers 68-71,  $R_2$  is not an alkoxyphenyl group). The fluorenylenevinylene unit D is a repeating unit of present formula (8) wherein  $Ar_2$  is a divalent group of formula (2'). The anthracenylene unit B is a repeating unit that is not excluded by the open language of the present claims. The presently claimed polymer must comprise at least one repeating unit of formula (1) and at least one repeating unit of formula (8). The presently claimed polymer may comprise more than one repeating unit of formula (1) and/or more than one repeating unit of formula (8). The presently claimed polymer may also comprise repeating units other than the unit(s) of formula (1) and the unit(s) of formula (8). Only present claims 6 and 7 place any limit on the relative amounts of repeating units of formulae (1) and (8) in the polymer, and these claims allow for up to 50 mol% of the total amount of repeating units to be units other than units of formulae (1) and (8). Shi's polymers 68-71 meet all the limitations of the polymer as defined in the present claims with the exception of the number-average molecular weight limitation and the requirement for at least one alkoxyphenyl group on the naphthylene unit of formula (1'), and the examiner's position regarding the obviousness of these limitations is as set forth in the rejection.

With respect to the rejection based on Noguchi et al., applicant argues that Noguchi does not disclose a copolymer comprising a naphthalene group and a fluorene group. While Noguchi et al. do not provide a specific example of a copolymer comprising a naphthalene group and a fluorene group, such copolymers are within the scope of Noguchi's disclosure. Noguchi's polymers having arylene groups in the main chain of the polymer. The polymers of Noguchi's claims 3, 4 and 5 have at least two different repeating units. Noguchi et al. disclose naphthylene

Art Unit: 1774

groups of present formula (1') and fluorenylene groups of present formula (2') as suitable for the arylene groups that are in the main chain of the polymer.

7. Applicant is advised that should claims 8-17 be found allowable, and if claim 18 is amended to depend from claim 1, claims 18-27 will be objected to under 37 CFR 1.75 as being a substantial duplicate of claims 8-17, respectively. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1774

9. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
September 07, 2007



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774